

COMPUTER SCIENCE TRIPOS Part IA – 2022 – Paper 1

4 Object-Oriented Programming (rkh23)

- (a) Explain the notion and value of type checking. Illustrate your answer using generic types in Java. [3 marks]
- (b) Explain the notion of type erasure. Why is it used in Java? [3 marks]
- (c) For each of the statements below, state whether they are true or false, and explain why.
- (i) `Integer` can be cast to `Number`. [1 mark]
 - (ii) `Set<Integer>` can be cast to `Set<Number>`. [2 marks]
 - (iii) `Set<Integer>` can be cast to `Set<? extends Number>`. [2 marks]
 - (iv) `Set<Integer>` can be cast to `Set<?>`. [2 marks]
 - (v) `Set<Set<Integer>>` can be cast to `Set<Set<?>>` [2 marks]
- (d) Given a generic class `TreeSet<T>`, explain the difference between:
- (i) `new TreeSet()`
 - (ii) `new TreeSet<Object>()`
 - (iii) `new TreeSet<>()`

When can each of these Java expressions be used and are there any advantages of using one over another? [5 marks]